



News Release

Defense Advanced Research Projects Agency

3701 North Fairfax Drive
Arlington, VA 22203-1714

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DARPA Kicks Off Mind's Eye Program

Ground surveillance is a mission normally performed by human assets, including Army scouts and Marine Corps Force Recon. Military leaders would like to shift this mission to unmanned systems, removing troops from harm's way, but unmanned systems lack a capability that currently exists only in humans: visual intelligence. The Defense Advanced Research Projects Agency (DARPA) is addressing this problem with Mind's Eye, a program aimed at developing a visual intelligence capability for unmanned systems.

Humans perform a wide range of visual tasks with ease, something no current artificial intelligence can do in a robust way. They have inherently strong spatial judgment and are able to learn new spatiotemporal concepts directly from the visual experience. Humans visualize scenes and objects, as well as the actions involving those objects and possess a powerful ability to manipulate those imagined scenes mentally to solve problems. A machine-based implementation of such abilities is broadly applicable to a wide range of applications, including ground surveillance.

The joint military community anticipates a significant increase in the role of unmanned systems in support of future operations including jobs like persistent stare. By performing persistent stare, camera-equipped unmanned ground vehicles (UGVs) would take scouts out of harm's way. Such a capability, however, would not constitute a force multiplier because human analysts would have to interpret streaming video from these platforms to detect operationally significant activities. A truly transformative capability requires visual intelligence, enabling these platforms to detect operationally significant activity and report on that activity so warfighters can focus on important events in a timely manner.

DARPA has contracted with 12 research teams to develop fundamental machine-based visual intelligence: Carnegie Mellon University, Co57 Systems, Inc., Colorado State University, Jet Propulsion Laboratory/CALTECH, Massachusetts Institute of Technology, Purdue University, SRI International, State University of New York at Buffalo, TNO (Netherlands), University of Arizona, University of California Berkeley and University of Southern California. These teams will develop a software subsystem suitable for employment on a camera for man-portable UGVs, integrating existing state of the art computer vision and AI while making novel contributions in visual event learning, new spatiotemporal representations, machine-generated envisionment, visual inspection and grounding of visual concepts.

DARPA has also contracted with three teams to develop system integration concepts: General Dynamics Robotic Systems, iRobot and Toyon Research Corporation. These teams are taking a collaborative approach to developing architectures incorporating newly-developed visual intelligence software onto a camera suitable as a payload on a man-portable UGV.

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Media with inquiries, contact DARPA Public Affairs, DARPAPublicAffairsOffice@darpa.mil